

WHAT IS CLAIMED IS:

1. A method for fabricating a semiconductor device comprising the steps of:

forming a gate electrode on a semiconductor substrate with a gate insulation film formed therebetween;

implanting a dopant in the semiconductor substrate with the gate electrode as a mask to form a doped region in the semiconductor substrate;

forming a chemical oxide film on the doped region, which prevents the dopant implanted in the doped region from diffusing outside the semiconductor substrate; and

performing thermal processing for activating the dopant implanted in the doped region.

2. A method for fabricating a semiconductor device according to claim 1, wherein

in the step of forming the gate electrode, a conductor layer is formed on the gate insulation film and patterned with a resist film as a mask to form the gate electrode,

the method further comprises, after the step of forming the doped region, the step of removing the resist film, and

the step of removing the resist film is also for forming the chemical oxide film.

3. A method for fabricating a semiconductor device

according to claim 1, wherein

in the step of forming the chemical oxide film, the chemical oxide film of a 1.4 nm-thickness or above is formed.

4. A method for fabricating a semiconductor device according to claim 2, wherein

in the step of forming the chemical oxide film, the chemical oxide film of a 1.4 nm-thickness or above is formed.

5. A method for fabricating a semiconductor device according to claim 1, wherein

in the step of the performing thermal processing, the thermal processing is performed in an atmosphere containing no oxygen.

6. A method for fabricating a semiconductor device according to claim 2, wherein

in the step of the performing thermal processing, the thermal processing is performed in an atmosphere containing no oxygen.

7. A method for fabricating a semiconductor device according to claim 3, wherein

in the step of the performing thermal processing, the thermal processing is performed in an atmosphere containing no oxygen.

8. A method for fabricating a semiconductor device according to claim 1, wherein

in the step of forming the chemical oxide film, the doped region is oxidized by at least any one of plasmas containing oxygen, oxygen radicals and a chemical liquid.

9. A method for fabricating a semiconductor device according to claim 2, wherein

in the step of forming the chemical oxide film, the doped region is oxidized by at least any one of plasmas containing oxygen, oxygen radicals and a chemical liquid.

10. A method for fabricating a semiconductor device according to claim 3, wherein

in the step of forming the chemical oxide film, the doped region is oxidized by at least any one of plasmas containing oxygen, oxygen radicals and a chemical liquid.

11. A method for fabricating a semiconductor device according to claim 5, wherein

in the step of forming the chemical oxide film, the doped region is oxidized by at least any one of plasmas containing oxygen, oxygen radicals and a chemical liquid.

12. A method for fabricating a semiconductor device according to claim 8, wherein

the chemical liquid is sulfuric acid/hydrogen peroxide mixture, ammonia/hydrogen peroxide mixture, hydrochloric acid/hydrogen peroxide/water mixture, an aqueous solution of ozone or nitric acid.

13. A method for fabricating a semiconductor device according to claim 9, wherein

the chemical liquid is sulfuric acid/hydrogen peroxide mixture, ammonia/hydrogen peroxide mixture, hydrochloric acid/hydrogen peroxide/water mixture, an aqueous solution of ozone or nitric acid.

14. A method for fabricating a semiconductor device comprising the steps of:

forming a gate electrode on a semiconductor substrate with a gate insulation film formed therebetween;

implanting a dopant in the semiconductor substrate with the gate electrode as a mask to form a doped region in the semiconductor substrate;

forming an oxide film by chemical vapor deposition at a film forming temperature of 250 - 500 °C on the doped region, which prevents the dopant implanted in the doped region from diffusing outside the semiconductor substrate; and

performing thermal processing for activating the dopant implanted in the doped region.

15. A method for fabricating a semiconductor device according to claim 1, wherein

in the step of performing the thermal processing, the thermal processing is performed by RTA.

16. A method for fabricating a semiconductor device according to claim 2, wherein

in the step of performing the thermal processing,

the thermal processing is performed by RTA.

17. A method for fabricating a semiconductor device according to claim 14, wherein

in the step of performing the thermal processing, the thermal processing is performed by RTA.